cc Wayne Hedberg

M/053/005

Tenneco Minerals
A Tenneco Company

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(303) 987-6200

March 19, 1991

Utah Bureau of Water Pollution Control
288 North 1460 West
P.O. Box 16690
Salt Lake City, UT 84116-0690

Attention: Mr. Don Ostler, Director

Re: Detailed Summary of Two Emergency Discharge Events - Goldstrike Mine

Dear Mr. Ostler:

Enclosed please find a detailed description of the two emergency discharge events that occurred at the Goldstrike Mine over the period of March 1 to March 5, 1991. Relevant information prior to, during and after the events is listed in chronological order. While the summary is quite lengthy, Tenneco Minerals believes that this is necessary so that the Bureau will understand Tenneco Minerals' response to the emergency conditions.

The emergency discharge events were the result of excess water added to the three process ponds from a precipitation event in which the Goldstrike Mine received 6.28 inches of rain over a 41 hour period. This precipitation event substantially exceeded the permitted 100 year, 24-hour design capacity of the three process ponds. Both discharge events were initiated to prevent an uncontrolled overflow of solution from the process water pond. An emergency overflow was inevitable during the first discharge event. The second discharge event was initiated in anticipation of a second storm event that was predicted by the National Weather Service to be of equal magnitude. The dark skies at that time were certainly threatening such an event and a true emergency was perceived by the onsite Tenneco Minerals' personnel.

Tenneco Minerals communicated very closely with the Bureau of Water Pollution Control throughout the event to keep the Bureau apprised of the activities taking place. Tenneco Minerals believes that it implemented the necessary actions to minimize impacts to the environment as a result of the extraordinary storm events. Had Tenneco Minerals not taken immediate action to control the situation, an uncontrolled overflow of untreated solutions would have been the result. Tenneco Minerals' actions to treat the solution and control the discharge with the large dilution from the storm events resulted in a discharge that Tenneco believes poses no danger to public health or the environment.

Tenneco Minerals conducted sampling at the discharge port, the sediment pond and several other downstream locations prior to, during and after the discharge events. The samples were analyzed for free cyanide using an onsite

colorimetric analyzer. Selected samples were sent to an offsite independent laboratory for analysis of cyanide, metals and other general parameters. Once all the results are received and compiled, a full report including the sample data will be submitted to your office.

We understand that you have expressed some concern that Tenneco Minerals continued to operate the leach facilities while addressing the overflow issues. This is not the case. On March 1, Tenneco Minerals stopped adding cyanide and makeup water to the system. Tenneco Minerals continued to apply the existing solutions, as diluted by the rain runoff, and added ore to the heaps to consume more water through evaporation and saturation of the ore heaps. This allowed Tenneco Minerals to maximize the amount of solution in the heaps and reduce the amount in the ponds. If everything were temporarily shut down, Tenneco Minerals would be faced with another overflow situation from all the drain down from the heaps.

Existing solutions are being run through the plant for gold recovery but, as stated above, no makeup water or cyanide has been added to the process since March 1, 1991. Tenneco Minerals will not add cyanide or makeup water to the system until it is confident that the issues have been appropriately addressed.

If you have any questions on the above or the enclosed, please call me at (303) 987-6256.

Sincerely,

Debra A. Brannum
Environmental Services Manager

cc: J. Badger
R. Johnson
K. Kluksdahl
R. Scheffel
M. Keller - Van Cott, Bagley

CHRONOLOGICAL SUMMARY OF EVENTS
GOLDSTRIKE MINE

February 28, 1991

The pond levels on February 28, 1991 at 4:00 A.M. (prior to the storm event) were as follows:

Preg	610,000 gallons
Barren	490,000 gallons
Process	50,000 gallons
	1,150,000 gallons

These levels were approximately 650,000 gallons below normal design operating levels. Total design capacity is approximately 1 million gallons per pond plus some 600,000 gallons of freeboard.

Precipitation began at the Goldstrike Mine at 4:00 a.m. on February 28, 1991. At Approximately 2:00 p.m., it was recognized that the newly laid flexible membrane liner (FML) on pad 2, cell 14, was contributing significant volumes of water to the system. This FML liner covered a total of 4.5 acres of exposed FML. An attempt to divert this flow from the leach pad system was completed by 4:00 p.m.

Day ending pond levels were as follows:

Preg	overflowing into the barren pond
Barren	800,000
Process Water	50,000

March 1, 1991

By midnight (12:00 a.m. Friday March 1) 3.45 inches of rain had fallen in 20 hours The ponds were designed and permitted through the Bureau to handle the 100 year 24-hour storm event which is 3.4 inches. Therefore, at this time, the precipitation event was already in excess of the 100 year 24-hour storm event of 3.4 inches.

At approximately 4:30 a.m. the preg pond was continuing to overflow into the barren pond and the barren pond was beginning to overflow into the process water pond. By 6:30 a.m., a total of 4.46 inches of rain had fallen. At this time it was discovered that the diversion of storm runoff from the newly laid FML was only about 50 percent effective due to heavy periods of rainfall. A better diversion was then put in place.

At 7:00 a.m., Tenneco Minerals ceased adding cyanide to the system. It was discovered at 8:00 a.m. that our contract mining company, Lost Dutchman Construction, sometime on Thursday, diverted runoff from the Padre mine haul road to the back side of Pad #1, Cells 7 and 8. This situation was immediately attended to and rectified by 11:30 a.m.

3/19/91

At 9:10 a.m., the preg pond was continuing to overflow into the barren pond and the barren pond was overflowing into the process water pond. The process water pond contained 380,000 gallons of water/process solution. At 10:00 a.m., the barren pump, which pumps solution to the heaps, was increased to 1000 gpm and mine personnel started applying solution to Pad #1, cells 1-4, 5 and 6 in order to remove and absorb as much barren solution as possible. This was the first time since October 1990 that application of solutions was applied to Pad 1. Tenneco Minerals believed this action to be prudent to consume more water in the heaps.

At approximately 11:40 a.m., the process pond contained 500,000 gallons of process solution/water with 500,000 gallons of capacity remaining. At that time Tenneco Minerals began setting up the equipment to neutralize process solution with calcium hypochlorite. Shortly thereafter, Debra Brannum attempted to notify Kiran Bhayani of the Utah Bureau of Water Pollution Control of the potential overflow situation. He was not available at the time, but was expected to return by 1:30 p.m.; therefore, a message was left for him.

At 1:55 p.m., the process water pond level was at 600,000 gallons. At approximately 2:30 p.m., a total of 5.65 inches of rain had fallen and it appeared inevitable that the pond would overflow uncontrolled if Tenneco Minerals did not initiate a controlled discharge. At this time, Tenneco Minerals began pumping the contents of the process water pond at a rate of 250 gpm into a 1,800 gallon treatment tank to neutralize the cyanide with calcium hypochlorite.

After treatment, the contents of the treatment tank were discharged to the sediment pond as permitted through the Bureau to receive solution during emergency overflow events. The sediment pond was already receiving substantial quantities of stormwater runoff. This controlled discharge minimized impacts to the environment by limiting the discharge to treated solutions.

At approximately 3:30 p.m., Debra Brannum contacted Kiran Bhayani of your office to inform him that we had begun discharging treated solutions to the sediment pond in an emergency situation.

When the emergency discharge began, sampling was conducted at six different locations on a frequent basis. These locations are as follows:

- at the discharge from the treatment tank
- upstream in the drainage from the sedimentation pond
- the sedimentation pond
- the seepage from the sedimentation pond
- upstream from the point near the road where Arsenic Gulch and the site drainage converge
- approximately 1-1/2 mile downstream in the East Fork of the Beaver Dam Wash near Eckenbrecht's Cabin

The samples were analyzed for free cyanide using an onsite Hach Colorimetric analyzer.

3/19/91

At 5:00 p.m., the process water pond level had risen to 700,000 gallons. At 9:00 p.m., the rain stopped. A total of 6.28 inches had fallen over the two day storm event. Not withstanding continued treatment and controlled discharge, the level in the process water pond continued to rise presenting continued emergency conditions. At approximately 11:59 p.m., the process water pond level reached 950,000 gallons which was within inches of the overflow pipe.

March 2, 1991

As excess water continued to drain down from the heaps, Tenneco Minerals continued the controlled discharge of treated waters from the process water pond to the sediment pond through March 2, 1991. Another storm event of equal magnitude was predicted by Bill Alder of the National Weather Service to impact the area March 4 through March 6, 1991. Tenneco Minerals could not prudently ignore this threat. In anticipation of this threat, liquid chlorine, another cyanide neutralizing agent, was ordered to be delivered to the site.

March 3, 1991

The emergency discharge of treated solution was discontinued at 4:00 a.m. A total of 532,500 gallons of treated solution had been discharged to the sediment pond. Samples at the discharge port from the treatment tank were collected during the discharge event for onsite analysis of free cyanide. These free cyanide readings during the discharge averaged 20 ppm which equates to about 156 pounds of sodium cyanide. However, after having contact time in the sediment dam, the seepage from this location was an average of 2.7 ppm and would equate to approximately 43 pounds of sodium cyanide assuming approximately 1:1 dilution with runoff water that drains from the property into the sediment dam.

In anticipation of the upcoming predicted storm event, neutralization with calcium hypochlorite continued with the treated waters being returned to the process water pond and not discharged. Chlorine was delivered to the site at approximately 4:00 p.m. and was added to the treatment tank late that evening. Lime and sodium hydroxide were also added to the treatment tank for pH control.

March 4, 1991

Neutralization with chlorine continued with the treated waters being returned to the process water pond. The preg pond was still overflowing at this time and the barren pond contained approximately 700,000 gallons and the level continued to rise. The process water pond contained 500,000 gallons. The National Weather Service continued to predict another storm event to hit the Goldstrike area this date through March 6, 1991.

At 11:00 a.m., Debra Brannum contacted Kiran Bhayani of the Bureau to inform him of the quantities discharged over the weekend and the fact that the sediment dam was leaking. Debra Brannum also informed him of Tenneco Minerals sampling efforts and the results of onsite analysis for free cyanide and that Tenneco Minerals believed it was necessary to discharge more treated water to handle the upcoming predicted storm event.

Kiran requested a summary of the situation to date and a written summary of our request to discharge additional treated water. This task was completed and faxed to Kiran at 11:45 a.m. Kiran indicated that he would get the appropriate UBWPC personnel to review the request and would respond as soon as possible. At 4:00 p.m., Debra Brannum contacted Kiran and stated that Bureau personnel were still reviewing the request and that he would call Tenneco Minerals the next day.

At the time, the skies were certainly dark and threatening. A true emergency situation was perceived by the onsite Tenneco Minerals personnel. In anticipation of the threatening storm event and in order to maintain control over the situation and minimize the impact to the environment, Tenneco Minerals started discharging treated water to the sediment dam at approximately 6:00 p.m. The solution was treated by dispensing chlorine into the pump discharge line which was placed inside an 8 inch PVC pipe. About 0.1 inches of rain had fallen late this evening.

The BWPC office was notified of the discharge through the State Health Department Emergency Response Section who was notified at about 2:45 a.m.

March 5, 1991

The second discharge event to the sediment pond ended at approximately 5:45 a.m. During this event, approximately 250,000 gallons of treated solution were discharged to the sediment pond. The same sampling locations that were sampled during the first discharge event were again sampled on a frequent basis. The average free cyanide concentration at the discharge from the treatment tank to the sediment pond was 1.2 ppm which equates to 5 pounds of sodium cyanide.

March 6, 7, 8, 1991

Tenneco Minerals and its technical consultants continued sampling activities at numerous locations for both onsite free cyanide analysis and for offsite analysis for cyanide, metals and other constituents.

The Arizona Emergency Response Unit and the Utah Bureau of Water Pollution Control also conducted sampling activities at the site during this time frame. Representatives from several other agencies visited the site during the week and appeared to be satisfied that impacts to the environment and public health were nonexistent or minimal due to Tenneco Minerals' treatment and controlled discharge of the process pond waters to the sediment pond and the substantial dilution from the storm event.

Tenneco Minerals continued neutralizing the contents of the process water pond with sodium chlorite and chlorine with the treated waters being returned to the process water pond and not discharged.

3/19/91

Tenneco Minerals also continued mining ore and loading it on the heaps to consume more water through evaporation and saturation of the ore heaps. No cyanide or makeup water has been added to the system since March 1, 1991.

As previously reported to the Bureau, a mine blast occurred at the site on March 6, 1991 that caused fly rock damage to the primary FML on all three ponds. Tenneco Minerals immediately began undertaking measures to repair the damage. This situation is being further reported under separate correspondence to the Bureau.

3/19/91